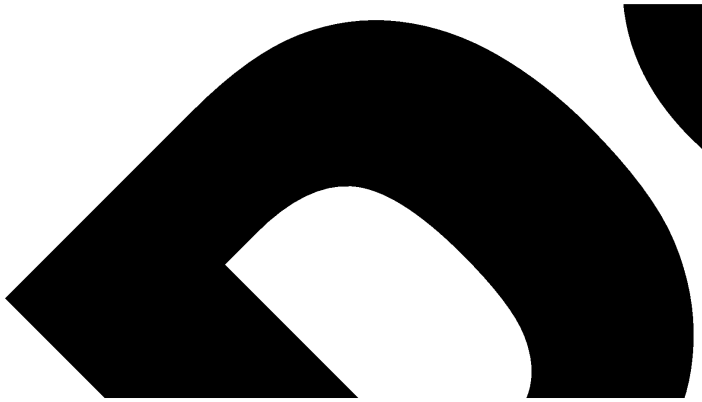

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DIRECTORATE OF
INTELLIGENCE

Intelligence Memorandum

USSR Turns to US for Color Television Technology

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
November 1968

INTELLIGENCE MEMORANDUM

USSR Turns to US for Color Television Technology

Summary

The USSR is preparing for a major expansion of color television. Technology and equipment for the manufacture of shadow masks for picture tubes recently have been purchased from the US firm of Buckbee-Mears. This purchase will pave the way for the mass production of color television receivers in the USSR. Construction has begun on a new rolling mill in the USSR to produce steel sheet for the fabrication of these shadow masks, and a plant for the production of ceramic capacitors for color receivers, capable of meeting Soviet needs for the next several years, has been acquired from Japan.

The US transaction represents a sharp turnabout in Soviet policy. Officially, the USSR is committed to use the French "chromatron" or maskless color picture tubes in Soviet-made receivers. France has already contracted to build a pilot facility in the USSR, to be followed by a larger facility, for an experimental run of the French tube. The Buckbee-Mears transaction not only is a reflection on the quality of the French picture tube but also is an admission of Soviet failure to duplicate US technology -- shadow masks have been under development for several years in the USSR.

The technology and equipment from the United States, under maximum utilization, will support

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the production of more than one million color sets annually. The goal for 1970 is 200,000 sets. Maximum output levels will probably be reached by 1975. The current high price of color sets (ranging from 600 to 1,200 rubles per unit) and limited color programming (20 hours per week of colorcasting in 1970)* will restrict initial demand for color television. As production expands, prices fall, and programming increases in the post-1970 period, the sale of color receivers should expand rapidly.

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* *According to a Resolution of the USSR Council of Ministers, "On Measures for the Development of Color Television in the USSR," adopted in August 1968.*

Introduction

1. Recent developments indicate that the USSR is accelerating preparations for major expansion of color television production. First, the Soviet trading agency Tekhnopromimport has concluded a contract with a US firm, Buckbee-Mears, for the purchase of a complete automatic production line, together with supporting equipment and technology, for the fabrication of shadow masks* for color television picture tubes in the USSR. Maximum annual output capacity of the line, in a two-shift mode, is rated at more than 1.5 million masks. Maximum output would support the production of more than 1 million color television receivers,** enabling the USSR to achieve a mass production capability. With the Buckbee-Mears equipment, color receivers can be produced in four screen sizes***: 16, 19, 23, and 25 inches (40, 47, 59, and 65 centimeters, respectively). Initial deliveries of the equipment will begin before the end of calendar year 1968 and are scheduled to be completed during the first quarter of 1969. The USSR also has the right to export unlimited quantities of shadow masks to the other Eastern European countries. The deal with Buckbee-Mears marks an abrupt departure from the earlier Soviet decision to base their color television industry on French, or on jointly developed French-Soviet, technology.

2. In addition, the USSR has begun construction in Asha, Chel'yabinsk Oblast, of a rolling mill for thin steel sheet for shadow masks for color picture tubes. Shadow masks are now being imported from Japan.

3. Finally, the USSR has purchased a plant from the Murata Manufacturing Company of Kyoto,

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* *Very fine perforated steel bands placed inside the color picture tube to guide electron beams to red, blue, or green phosphor coatings. Both the clarity of color and sharpness of the image on the screen depend on the precision engineering of these masks.*

** *At US reject rates, 1.3 masks are required for one color television tube.*

*** *As measured diagonally across the screen.*

Japan, for the manufacture of ceramic capacitors for use in color television receivers, and probably other television and radio sets as well. The deal includes technical assistance and is valued at $3.3 million. On the basis of US experience, this amount of investment would have a potential annual yield of 300 million to 500 million capacitors, enough for an annual output of 3 million to 5 million color television receivers. It will be fully operational by mid-1970 and will be able to satisfy the requirements for capacitors for Soviet color television for at least a decade.

Current Status of Soviet Color Television

4. Color television equipment has been under development in the USSR for more than 10 years, but progress has been slow. A production prototype of a color receiver was built by the Leningrad "Kozitskiy" Plant as early as 1959. It was even claimed in the Soviet press that serial production of three different models would begin in that year. Nearly 10 years later, large-scale production of color receivers still has not been established.* Failure to produce color receivers on a mass basis is primarily related to the inability of the USSR to mass produce color television tubes. Prolonged attempts to duplicate US shadow mask technology have been unsuccessful. Some color television sets are now being produced on a small batch basis, using the shadow masks imported from Japan. Four models have been developed (two 16-inch models and two 23-inch models), and a few of them are being produced in three plants: the Aleksandrov Radio Plant, the Leningrad "Kozitskiy" Plant, and the Moscow Television Plant (see the table).

5. According to official claims, only 2,000 color television sets were produced in the USSR in 1967 (compared with 5.8 million in the United States -- see the chart). Moreover, their

* *Nevertheless, color broadcasts in the USSR began, as scheduled, in November 1967 in time for the 50th anniversary celebration of the Bolshevik Revolution. Moscow Central television studios currently broadcast six hours per week in color.*

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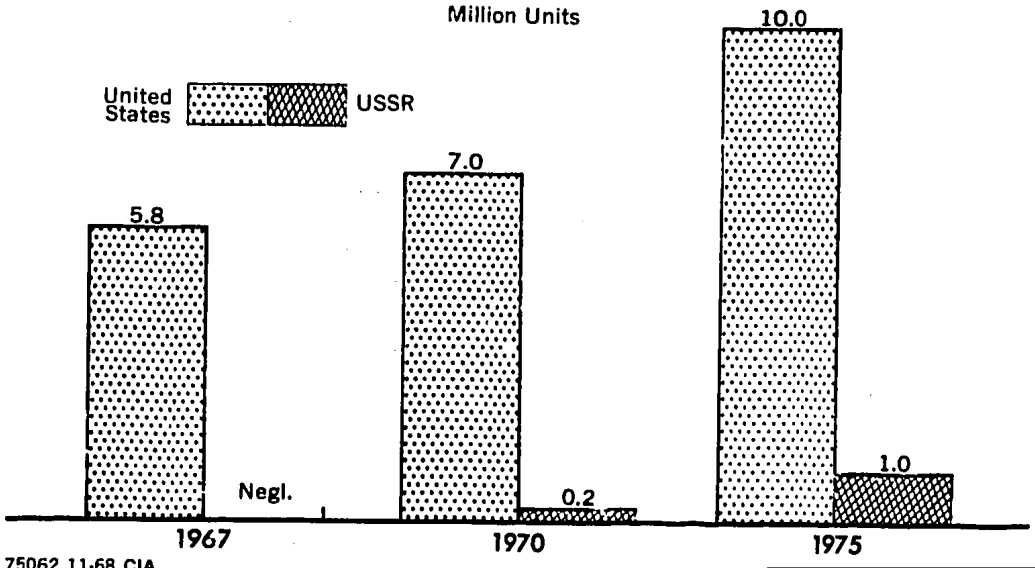
United States and USSR: Actual Production of Color Television Receivers
1967 and Estimated for 1970 and 1975



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reliability and picture quality were very low by US standards and their prices relatively high, reflecting the small scale of production. The 16-inch models are priced at 648 and 900 rubles and the 23-inch models at 1,200 rubles. In real terms, prices of the cheapest Soviet color receivers are equivalent to at least five months' wages for the average industrial worker in the USSR; by comparison, the average US price is equivalent to less than one month's wages for a US worker. Mass production methods will permit Soviet prices to be lowered.

6. It was clear at the outset of the current five-year plan period that foreign assistance would be needed if large-scale production of color receivers were to be achieved within the period. The USSR first turned to France for assistance.

Franco-Soviet Cooperation

7. The USSR and France have been engaged jointly in research and development of color

television equipment since early 1965* with few positive results. The USSR has procured French-designed studio color equipment such as cameras for installation in the color broadcasting facilities at Ostankino, and France and the USSR have jointly carried out experimental color broadcasting via the Soviet "Molniya" satellites. But at least part of the justification for entering into a cooperative effort with France was the expectation that French assistance would shorten the development cycle for color receivers in the USSR and thus enable the Soviets to meet their timetable for the large-scale introduction of color television. The USSR hoped to make the French color picture tube -- called "chromatron," or maskless tube -- the basis for the mass production of color receivers.

8. In early 1967, the French firm *Compagnie Française de Télévision* (CFT) contracted with Tekhnopromimport to build a pilot facility in the USSR (apparently in 1968) for the production of maskless tubes. This experimental plant, with a capacity of 2,000 tubes per year, apparently was to be followed by a second and larger facility for industrial-scale production of these tubes. There is no evidence that any facility has yet been built. Moreover, CFT apparently encountered major problems in developing the technology for industrial-scale production. In early 1968, on the initiative of the government, the French color picture tube development program was reorganized and placed under the management of a new firm, *Société Nouvelle du Tube Français* (SNTF).

9. Uncertainties surrounding the prospects for the French tubes were probably instrumental in the recent sudden shift to the US mask-type technology. Moreover, the relatively large capacity provided for in the contract with Buckbee-Mears and the fact that the USSR is building a plant to supply rolled steel exclusively for the fabrication

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* *A Franco-Soviet agreement for technical cooperation in color television was signed on 22 March 1965. In addition to joint research and development, the agreement provided for the mutual sale and exchange of licenses, and the mutual transfer of equipment, information, technical documentation, specialists, and trainees.*

of masks may indicate that current Soviet commitments to the French tube have been cancelled or drastically modified.

Plants and Prospects

10. The USSR has set modest goals for the production of color television receivers during the remainder of the current five-year plan period, as follows: 1968, 15,000; 1969, 90,000; and 1970, 200,000.

11. Despite the fact that the demand for black and white television sets of satisfactory quality is far from satisfied, the USSR is pressing to meet its goals for the production of color sets. The Soviets now plan to produce at least 300,000 shadow masks by 1970, the equivalent of about 230,000 color picture tubes or receiving sets. Plan fulfillment will hinge on the timely delivery and installation of the Buckbee-Mears equipment and on the availability of trained personnel.*

12. The big push in Soviet color television will probably take place after 1970; current plans call for an increase of color programming in 1970 to 20 hours per week at the Moscow Television Broadcasting Center, and some color-casting will be initiated in other major cities as well. Although no formal plans have yet been announced for the post-1970 period, it appears that the output of color receivers is scheduled to grow to a level of 1 million to 1.5 million sets annually by 1975.

* *Ten man-months will be devoted to training up to four Soviet technicians in the United States under the contract with Buckbee-Mears.*

Soviet Color Television Receivers

Type	Developer/Producer	Status of Development/ Production	Current Rate of Production	Price (Rubles)	Number of Tubes	Number of Semiconductors	Diagonal Screen Size (Centi-meters)	Power Consumption (Watts)
Raduga-4	Leningrad "Kozitskiy" Plant	Production in 1967	Batch	900	14	46 transistors, diodes unknown	40	280
Raduga-5	Leningrad "Kozitskiy" Plant	Production in 1967	Batch	1,200	11	91	59	260
Record-101	Aleksandrov Radio Plant	Development completed in mid-1968	Batch	648	29	N.A.	40	N.A.
Rubin-401	Moscow Television Plant	Production initiated about August 1968	Batch	1,200	24	60	59	400